Work Plan to Evaluate Ozone Damage in the Dolly Sods and Otter Creek Wilderness, Monongahela National Forest

By

William A Jackson
Plant Pathologist

Forest Pest Management
Morgantown, WV 26505

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The Dolly Sods and Otter Creek Wildernesses have been designated as Class I air quality under the Clean Air Act of 1977. Class I air quality limits the additional increment of air pollution allowed within the two wildernesses. Therefore, new major pollution emission sources are not to increase air pollution levels such that resource values are impacted.

Air pollution is suspected of causing injury to plants throughout the Eastern United States. Ozone is considered to be the primary air pollutant involved and can be monitored by examining ozone sensitive plants. A biological evaluation conducted by Forest Pest Management (Morgantown, WV) in 1988 reported ozone symptoms were present on some bioindicator plants at Dolly Sods and Otter Creek Wilderness.

Objectives

The objectives of this study are:

1) Evaluate the current distribution and intensity of apparent ozone damage within the two wildernesses.

2) Recommend a monitoring strategy, based on survey results, to efficiently monitor ozone impact to sensitive species.

Materials and Methods

Survey. The surveys will begin the week of August 21, 1989. Figures 1 and 2 show the location of the ozone plots established in 1988. Tables 1 and 2 lists the plot descriptions and the bioindicators present at each plot. The observations to be recorded on each of the 15 bioindicators present at each plot are:

1. The percentage of foliage with any ozone type symptoms.

2. Rate individuals according to the following severity classification:

    0 = absent
    1 = trace (1 - 5 percent of the leaf with symptoms)
    2 = light (6 - 25 percent of the leaf with symptoms)
    3 = moderate (26 - 50 percent of the leaf with symptoms)
    4 = heavy (greater than 50 percent of the leaf with symptoms)

Samples of plant materials (one branch or herbaceous plant) will be taken and place them in a plant press for the following conditions:

1. The first individual of a species in a plot that is recorded to have ozone damage.

2. Species of plants that are not known to the field crew to be sensitive to ozone, but show ozone symptoms.

3. Individuals in a plot in which the field crew members are not confident the damage is ozone related.

Care should be taken so sample collecting is not obvious to other users of the wilderness, and injury does not occur to woody species. Samples will be examined by the Morgantown FPM staff for other possible insect and disease agents.

Safety. Each field crew member should carefully study the safety manual written for the Red Spruce Decline project. Extra care needs to be taken at Dolly Sods because there may be undetonated bombs in the wilderness.

Report. The final report for the evaluation should be completed by February 23, 1990. The report will contain the following:

1. Tables will be compiled to show the intensity of ozone damage found within the two wildernesses. Also, a map for each ozone bioindicator will be produced, for each wilderness, if there are obvious zones of ozone damage.

2. Recommend a monitoring strategy to efficiently monitor ozone impact to sensitive species.

Costs.

Travel (four people)	$600
Mileage and other misc.	400
ESTIMATED TOTAL	$1000

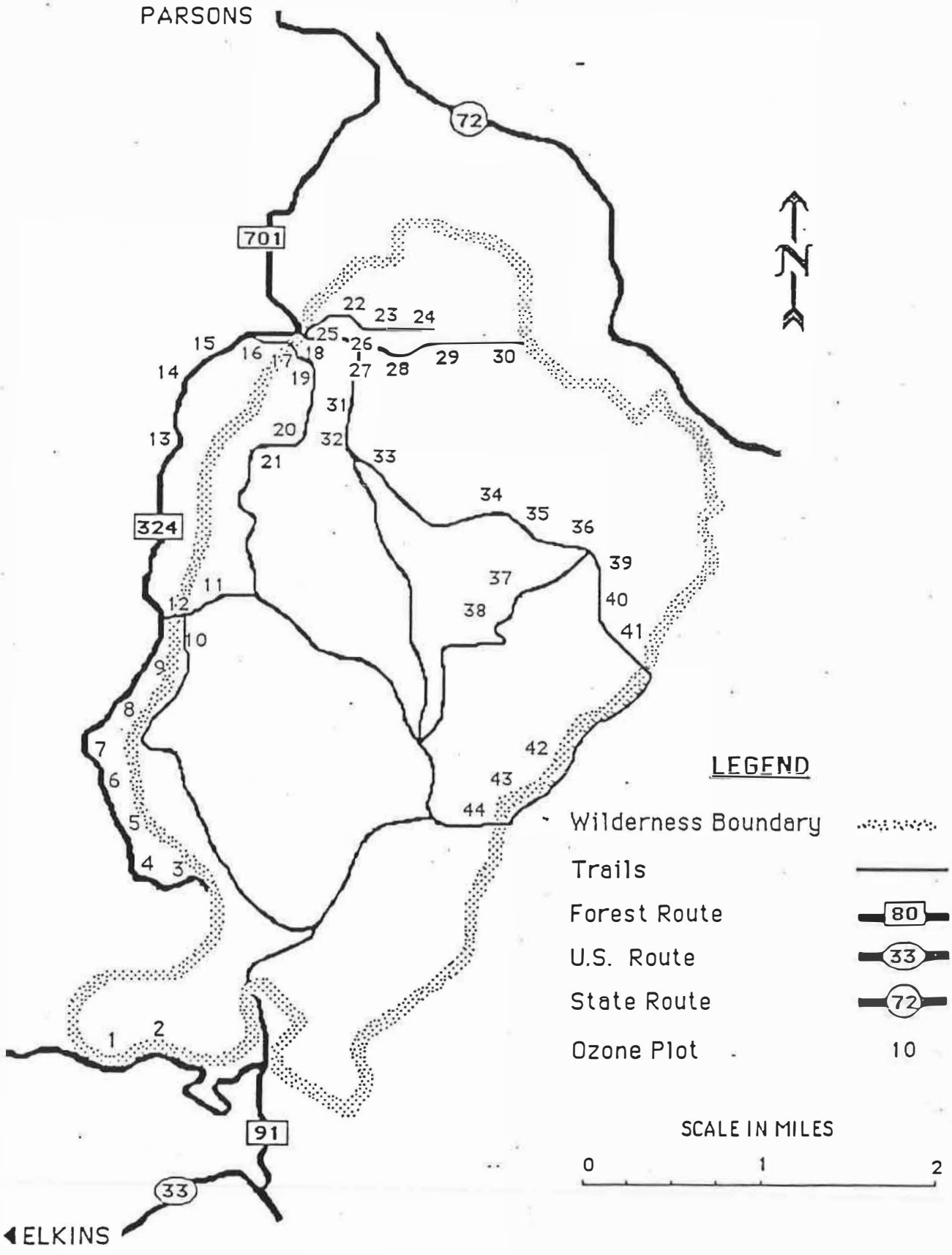

Figure 1. Location of ozone plots in Otter Creek Wilderness, July, 1988.

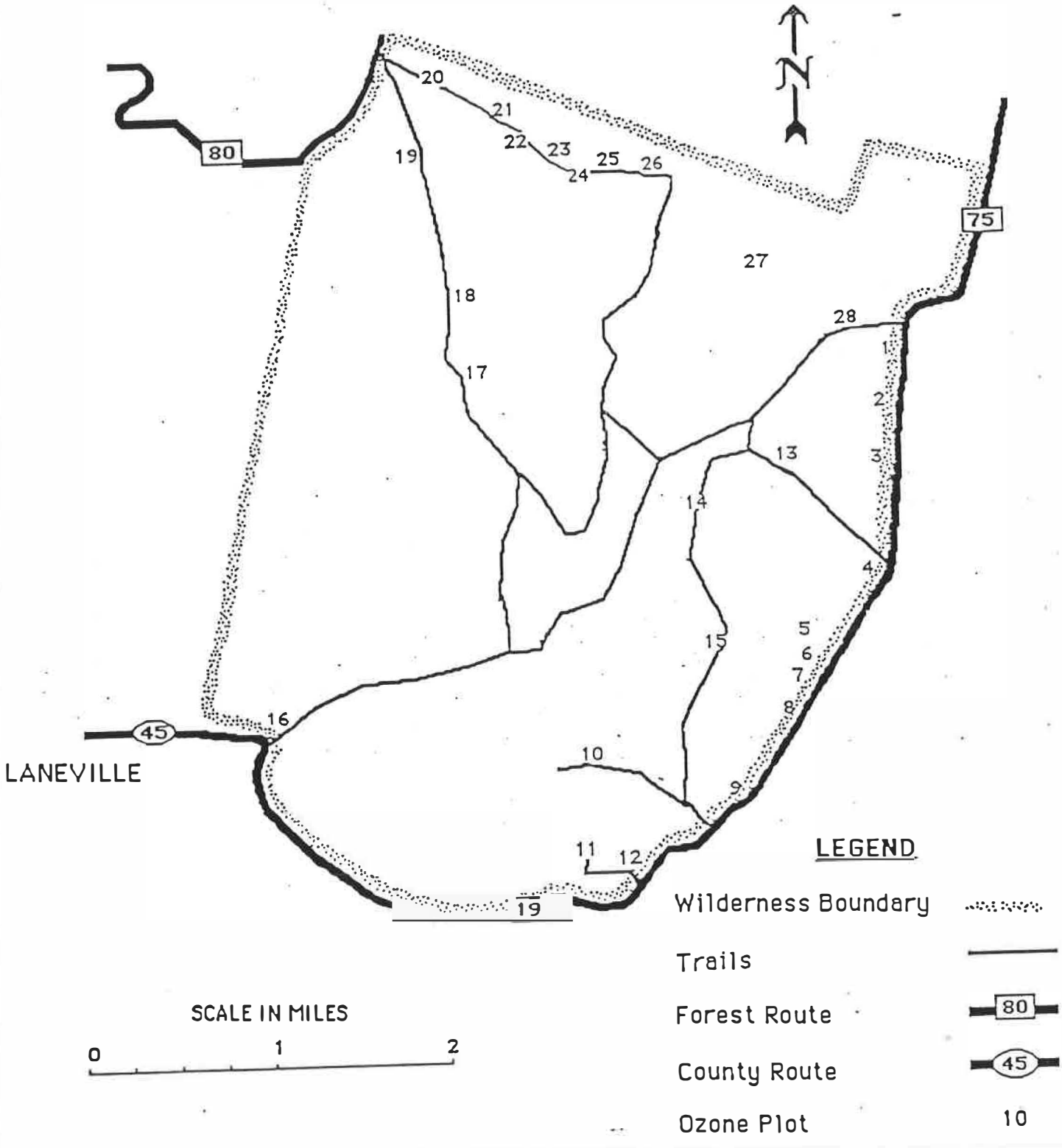

Figure 2. Location of ozone plots in Dolly Sods Wilderness, August, 1988.

Table 1. Site characteristics and bioindicator plants present at the 28 ozone plots at the Dolly Sods Wilderness, Monongahela National Forest.

Plot Number	Azimuth	Elevation (feet)	Slope Position	Percent Slope	Site Description	Site Disturbances	Bioindicators Present
1	280	4020	upper	5	along the road		common milkweed
2	273	4030	upper	20	along the road		common milkweed
3	273	4000	upper	5	along the road		common milkweed
4	---	4010	ridge top	0	along the road	logging evidence	common milkweed
5	10	3960	upper	5	open field	logging evidence	witch-hazel
6	---	3960	flat	0	forest opening	logging evidence	witch-hazel
7	---	3960	flat	0	open field	logging evidence	Viburnum sp.
8	---	3940	ridge top	0	along the road	logging evidence	trembling aspen
9	140	4000	ridge top	5	along the road		common milkweed
10	353	3880	upper	5	trail opening	old logging road	black cherry
11	235	4000	upper	20	wildlife opening		honey locust
12	244	3940	middle	15	trail opening	old logging road	witch-hazel
13	300	3610	ridge top	5	wildlife opening		4 clones of common milkweed
14	300	3640	ridge top	2	wildlife opening		3 clones of common milkweed
15	290	3780	ridge top	5	forest opening		black cherry, common milkweed
16	---	2740	flat	0	trail opening	old logging road	common milkweed
17	309	3700	middle	10	sod		Viburnum sp.
18	228	3720	upper	10	sod		trembling aspen
19	---	3720	flat	0	sod		black cherry
20	203	3800	upper	10	sod		Viburnum sp.
21	342	3800	lower	5	sod	beaver pond	black cherry, trembling aspen
22	311	3810	upper	5	sod	beaver pond	black cherry
23	290	3840	upper	5	wildlife opening		trembling aspen
24	110	3820	upper	5	sod		trembling aspen
25	---	3820	flat	0	sod		Viburnum sp.
26	---	3800	flat	0	sod		black cherry
27	---	3830	flat	0	forest opening		Viburnum sp.
28	222	3820	upper	10	forest opening		black cherry

Table 2. Site characteristics and bioindicator plants present at the 44 ozone plots at the Otter Creek Wilderness, Monongahela National Forest.

Plot Number	Azimuth	Elevation (feet)	Slope Position	Percent Slope	Site Description	Site Disturbances	Bioindicators Present
1	98	3660	middle	15	trail opening	old logging road	common milkweed
2	18	3620	upper	40	along the road		blackberry
3	144	3160	middle	35	along the road		blackberry, tulip poplar
4	212	3220	middle	45	along the road		blackberry
5	265	3320	middle	35	along the road		blackberry, tulip poplar
6	263	3480	middle	30	along the road		blackberry, black cherry
7	250	3560	upper	55	along the road		blackberry, elderberry
8	280	3500	middle	60	along the road		blackberry, black cherry common milkweed
9	344	3400	middle	60	along the road		blackberry, common milkweed
10	325	3380	middle	10	trail opening	old logging road	blackberry, black cherry
11	---	3300	flat	0	forest opening	old beaver meadow	black cherry, witch-hazel
12	84	3300	middle	10	along the road		tulip poplar
13	300	2800	middle	5	clear cut / planted	logging evidence	blackberry, common milkweed tulip poplar, white ash
14	---	2780	flat	0	clear cut	logging evidence	blackberry, common milkweed
15	338	2640	lower	30	clear cut	logging evidence	blackberry, elderberry tulip poplar
16	160	2640	middle	30	trail opening	old logging road	blackberry, common milkweed
17	170	2640	middle	15	trail opening	old logging road	blackberry, common milkweed
18	206	2650	middle	60	trail opening	old logging road	blackberry, elderberry
19	190	2780	middle	30	trail opening	old logging road	elderberry
20	178	2940	middle	40	trail opening	old logging road	blackberry, tulip poplar white ash
21	190	3020	middle	30	trail opening	old logging road	blackberry, tulip poplar
22	94	2480	middle	30	trail opening	old logging road	blackberry
23	162	2460	middle	10	trail opening	old logging road	aster, blackberry, northern fox grape
24	192	2550	middle	75	trail opening	old logging road	elderberry, northern fox grape, tulip poplar

Table 2. (Continued).

Plot Number	Azimuth	Elevation (feet)	Slope Position	Percent Slope	Site Description	Site Disturbances	Bioindicators Present
25	156	2150	lower	15	trail opening		elderberry
26	110	2200	middle	10	trail opening		elderberry
27	84	2140	lower	30	forest opening		blackberry
28	---	2060	flat	0	trail opening		blackberry
29	---	2060	flat	0	trail opening		blackberry
30	---	1920	flat	0	trail opening		blackberry
31	---	2100	flat	0	forest opening		blackberry, elderberry
32	---	2100	flat	0	forest opening		blackberry
33	---	2260	flat	0	forest opening	old logging camp	blackberry
34	---	3320	flat	0	trail opening		black cherry
35	---	3340	flat	0	trail opening		black cherry
36	170	3340	flat	5	trail opening		black cherry
37	330	3380	upper	5	trail opening		black cherry
38	---	3365	flat	0	trail opening		black cherry
39	---	3540	flat	0	trail opening		witch-hazel
40	60	3540	upper	35	trail opening		blackberry, black cherry
41	40	3560	upper	35	trail opening		blackberry, black cherry, witch-hazel
42	---	3500	ridge top	0	trail opening		blackberry
43	200	3460	ridge top	3	trail opening		black cherry
44	172	3320	upper	65	trail opening		blackberry

United States Department of Agriculture | Forest Service | NA | MFO

Reply to: 3420 August 4, 1989

Subject: Ozone Surveys at Dolly Sods and Otter Creek Wildernesses

To: Jim Page, Forest Supervisor, Monongahela National Forest

Enclosed is a copy of the work plan for the ozone surveys to be conducted at the Dolly Sods and Otter Creek Wildernesses. Bill Jackson and Lisa Arbucci will be conducting the surveys beginning the week of August 21, 1989. Please contact Bill Jackson (FTS: 923-4133) if you have any questions regarding the ozone surveys.

PETER A. RUSH
Field Representative
Forest Pest Management

Enclosure

cc: AO, FPM
B. Edgerton, MNF SO (w/enclosure)

WAJ/mae